

FACULTAD DE INGENIERÍA

Escuela Académico Profesional de Ingeniería Mecatrónica

Tesis

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Tarma Valley by controlling soil moisture**

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Para optar el Título Profesional de
Ingeniero Mecatrónico

Huancayo, 2021

Design of an Automated Drip Irrigation System in Tarma Valley by Controlling Soil Moisture

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Abstract—This article explains and describes the advantages and benefits of designing a soil moisture control system for the drip irrigation system in Tarma Valley. The main results indicate that it is possible to control the humidity level of the soil to 100% and to carry out the hydric restriction to 40% during the period of hardening of the soil. By applying an automated irrigation control system in Tarma Valley, water waste is significantly avoided on farmland in this valley. In the same way, with this drip irrigation system you can control the amount of soil moisture in a simple and easy way. With the execution of this project, the drip irrigation system in the Tarma Valley, the growth of the plants will be optimized in accordance with a high-quality control. It is concluded that it is possible to design a soil moisture control system for the drip irrigation system in Tarma Valley.

Keywords—*humidity control, automated system, drip irrigation*

I. INTRODUCTION

The scarcity of water is fundamentally due to the lack of optimal infrastructure that allows water to be stored in the rainy periods so that it can be distributed to all the lands and inhabitants who are dedicated to agricultural activity. In our country, irrigation has always been a determining factor in improving food security, agricultural and productive growth, and human development in rural areas of the country [1]. To avoid the excessive waste of water, it is necessary to carry out a correct management of the temperature and humidity in the environment because otherwise abiotic diseases would occur that would seriously affect people and plants. Water, despite being a renewable resource and apparently abundant on the planet, is a scarce good that is depleted; for this reason, its use for the practice of irrigation in gardening must be carried out in the most efficient way possible, avoiding excessive consumption. It is anticipated that in 2030 the world will have to face a world deficit of 40% of water in a climatic scenario [2]. Therefore, the following problem arises, what will be the

benefit of applying an automated drip irrigation system in Tarma Valley - Peru?

In previous research [3] a design of an automated drip Greek system for cocoa cultivation was proposed. The model shows a structure made up of hydraulic equipment and turbo machines. Regarding the results, the economic profitability of the project is determined, through the following financial ratios: VAN, IRR, RBC and PRI, corresponding to s./236'440.83 soles, 32.09%, 1.53 and third year respectively. Resulting economically acceptable and positive.

In a similar case [4] a temperature, soil humidity and relative humidity control system is described to optimize the yield of crops under cover in Corhuila. This proposal is made up of star-type nodes that are directly interconnected to the main source known as Gateway. The result indicates that the implementation of XBEE modules in the WSN developed, allowed to implement a communication by wireless means with the purpose of generating an interconnection and communication between devices.

Finally [5], a pilot project for the design of a drip irrigation system for coffee crops was carried out. The following results were found: The plot "El Chorro" has a maximum elevation of 1522.0 m.a.s.l. and a minimum elevation of 1428.0 m.a.s.l. It presents an average slope of 35.94% in the E-W direction, and in the S-N direction the average slope is 6.9%.

In the specific case of Tarma Valley, with this academic work the implementation of a drip irrigation system is proposed, to significantly save water, such that it allows to distribute this vital element to all the inhabitants. From the design system with mechanical, mechatronic, and control systems, it is desired to obtain an automated irrigation system capable of controlling soil moisture. In addition, more efficiently distribute water from surface sources, and avoid wasting water in the farmlands of Tarma Valley.